

In a time-division multiplexing wireless communication system, an antenna module has plural antenna elements. Receiver high-frequency circuit synthesizes signals from the antenna elements according to an antenna directivity having a desired beam pattern. Demodulator selects one of the received signals from wireless terminals according to the synthesized received signals, and determines transmission beam direction information for use in directing the beam in the selected direction. Weighting circuit generates weight coefficients for setting of the beam patterns and transmission beam directions according to the transmission beam direction information, and produces transmission time slots according to a table listing the relations of the transmission beam directions and the time slots for use in the beam radiation in those directions. Down-link fixed beam-forming circuit and modulator control the antenna module using the generated beam pattern, beam direction and transmission time slots to transmit the down-link signal.